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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/437,764	11/09/1999	LOUIS C. YUN	015685-032/5	8412

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GREGORY D. CALDWELL  
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN  
12400 WILSHIRE BLVD  
SEVENTH FLOOR  
LOS ANGELES, CA 90024

EXAMINER

LOGSDON, JOSEPH B

ART UNIT	PAPER NUMBER
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2662

DATE MAILED: 02/27/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

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**Office Action Summary**

Application No.

09/437,764

Applicant(s)

YUN ET AL.

Examiner

Joe Logsdon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 February 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**Claim Rejections—35 U.S.C. 102(b):**

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3 and 10-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Gerlach et al. (1993). Gerlach et al. (1993) teaches a closed loop technique in which each mobile user feeds back to the base station estimates of the received signal amplitudes; using this feedback, the base station achieves precision beamforming (abstract). Each of a plurality of base stations sends downlink information signals to each of several mobile stations. Each base station comprises an array of antennae, which is coupled to a beamformer; a beamformer is inherently a signal processor. A total of  $p$  probing signals (each probing signal is a type of "downlink pilot signal") are sent from the base station to the mobile station. Each probing signal is determined by a vector of weights (a "weight set"); this vector has dimension  $m$ , where  $m$  is the number of antennae in the array. The desired beam shape depends on the location of the mobile relative to the base station, and the beam shape is determined by the weight vector; therefore, the weight vector depends on the location of the mobile station relative to the base station. The mobile station measures the amplitude of the probing signals; the amplitude of these signals is a type of signal "quality." The mobile station then "reports" this measured "quality" to the base station by sending back a matrix determined by the amplitudes of the measured probing signals corrupted by zero mean Gaussian noise. At least two probing signals are needed to uniquely determine the

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channel matrix A. The base station assigns the weight vector based on this "report" of "quality." Each probing signal inherently comprises a unique identifier because each different probing signal is represented by a different weight vector; the weight vector can therefore be considered an identifier of the probing signal. (See pages 1432-1434.)

### **Claim Rejections—35 U.S.C. 103(a):**

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 4, 5, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerlach et al. (1993).

With regard to claims 4 and 13, Gerlach et al. (1993) teaches that each probing signal can be a tone at a single carrier frequency. Gerlach et al. (1993) fails to teach that the probing signals contain identifiers that identify the base stations; that the identifiers identify different base stations; and that the base stations are separated a distance sufficient to assure that pilot signals, which identify a second base station, transmitted from the first base station do not interfere with communication between the second base station and the mobile stations currently communicating with the second base station. It would have been obvious to one of ordinary skill in the art to modify the teaching of Gerlach et al. so that each probing signal contains an identifier, which could, for example, be a specific carrier frequency, of the base station that transmits it and so that adjacent base stations are separated far enough that there is no interference between adjacent cells because such an arrangement allows each mobile station to determine the source of any given probing signal and, therefore, the base station to which the response should be sent.

With regard to claims 5 and 14, Gerlach et al. (1993) fails to teach that the mobile station receives at least one pilot signal from another base station, and that the amplitudes of the three pilot signals at the mobile station are used by the base station with which the mobile is currently communicating to determine whether to handoff the mobile station. Examiner takes Official Notice that it has been common practice in the art to arrange a mobile communication system so that the mobile station receives at least one pilot signal from another base station, and so that the amplitudes of the three pilot signals at the mobile station are used by the base station with which the mobile is currently communicating to determine whether to handoff the mobile station. It would have been obvious to one of ordinary skill in the art to modify the teaching of Gerlach et

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al. so that the mobile station receives at least one pilot signal from another base station, and so that the amplitudes of the three pilot signals at the mobile station are used by the base station with which the mobile is currently communicating to determine whether to handoff the mobile station because Examiner takes Official Notice that such an arrangement has been common practice in the art as an arrangement that allows a mobile station to communicate with the base station from which it would receive the highest amplitude signals.

6. Claims 6-9 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerlach et al. (1993) in view of the Admitted Prior Art.

With regard to claims 6, 7, 15, and 16, Gerlach et al. (1993) fails to teach that the cellular communication system conforms to the IS-95 standard; that each SU automatically monitors the pilot signals; that the SU generates a report message when the SU determines that one of the pilot signals has a quality that exceeds some threshold; that the report message identifies the pilot signal; and that the set of pilot signals comprises either a Candidate Set, a Neighbor Set, or a Remaining set. The Admitted Prior Art teaches that according to the well-known IS-95 air interface standard an SU monitors these three sets of pilot signals (page 9, lines 24-27); that when a pilot signal from one of these sets has an amplitude that exceeds some threshold a pilot signal measurement message is sent from the SU to the base station; and that the message identifies the pilot signal (page 8, lines 22-25; page 10, lines 18-27). It would have been obvious to one of ordinary skill in the art to modify the teaching of Gerlach et al. so that the cellular communication system conforms to the IS-95 standard; that each SU automatically monitors the pilot signals; that the SU generates a report message when the SU determines that one of the

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pilot signals has a quality that exceeds some threshold; that the report message identifies the pilot signal; and that the set of pilot signals comprises either a Candidate Set, a Neighbor Set, or a Remaining set because such an arrangement would make use of an already existing standard thereby ensuring that the implementation of the system is feasible.

With regard to claims 8, 9, 17, and 18, Gerlach et al. (1993) fails to teach that a determination of whether to hand off is made based in part on the received report signal and that an estimate of the weight set to be used after handoff is sent to the second base station. The Admitted Prior Art teaches that according to the well-known IS-95 air interface standard an SU monitors these three sets of pilot signals (page 9, lines 24-27); that when a pilot signal from one of these sets has an amplitude that exceeds some threshold a pilot signal measurement message is sent from the SU to the base station; and that the message identifies the pilot signal (page 8, lines 22-25; page 10, lines 18-27). This suggests that the report (measurement message) could be used to determine whether to handoff; if a pilot signal strength is stronger for one base station than for the one currently serving the subscriber unit, a handoff to the former base station should be made. This further suggests that the optimum weight set, which had previously been determined by the serving base station could be sent to the new base station so that it can determine an optimum set of weights. It would have been obvious to one of ordinary skill in the art to modify the teaching of Gerlach et al. so that a determination of whether to hand off is made based in part on the received report signal and that an estimate of the weight set to be used after handoff is sent to the second base station, as suggested by the Admitted Prior Art, because such a strategy would allow seamless handoffs to occur because each time the subscriber unit hands off to a new base station, which would be the best base station in the sense that it is the base station with the

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strongest signal, the new base station would already have its weights adjusted appropriately.

7. Claims 19-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dybdal et al.

Dybdal et al. discloses an adaptive transmitting array antenna (abstract). The antenna array comprises receive and transmit signal circuitry connected to an antenna array and a transmit weight processor connected to the receive signal circuitry (Fig. 3; column 9, lines 6-53). The receive signal circuitry receives a report signal (reflected signal) corresponding to at least one pilot signal (column 4, line 58 to column 5, line 17). The transmit weight processor determines a weight set applied to a transmitted signal based, at least in part, on the received report signal (column 9, lines 54-64). The transmitted signal is both a pilot signal and a data signal because it provides information that is used to obtain the report signal (i.e., reflection of the transmitted signal). The transmit circuitry therefore transmits the pilot signal. Dybdal et al. fails to teach that the transmitted signals are downlink signals in the sense that they are sent from base station to subscriber unit and that the transmit circuitry is coupled to the pilot circuitry. It would have been obvious to one of ordinary skill in the art to modify the invention of Dybdal et al. so that the transmitted signals are downlink signals and so that the transmit and pilot circuits are coupled together because the invention of Dybdal et al. would help to combat interference and reflections for terrestrial as well as for satellite applications, and coupling the pilot and transmit circuits together would reduce the amount of circuitry that is required.



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8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Brennan et al. is cited to show the state of the art.

### **Response to Arguments:**

9. Applicant argues that the prior art does not apply because the “probing signal” of the prior art is not a “pilot signal” as recited in the claims. Brennan et al., however, reveals that a probe signal is, in a similar context to that of the claims, also a pilot signal (abstract; column 2, lines 43-51). Applicant’s argument that a “probing signal” is not an “existing pilot signal” is irrelevant because the claims do not recite “existing pilot signal.”

### **Conclusion**

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Logsdon whose telephone number is (703) 305-2419. The examiner can normally be reached on Monday through Friday from 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou, can be reached at (703) 305-4744.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-4700.

12. **Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

**Or faxed to:**

(703) 872-9314


For informal or draft communications, please label "PROPOSED" or "DRAFT".

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive,  
Arlington, VA, Sixth Floor (Receptionist).

Joe Logsdon

Patent Examiner

Thursday, February 21, 2002

  
HASSAN KIZOU  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600